

From post-industrial towards post-consumer textile recycling

TexPlus: “real life” collaboration in circular textiles – a local initiative

The Global Challenge

“Textiles are the fourth highest-pressure category for the use of primary raw materials and water, after food, housing and transport, and fifth for GHG emissions.

It is estimated that less than 1% of all textiles worldwide are recycled into new textiles.”

Source: EU new circular economy action plan



European
Commission

Circular Economy Action Plan

For a cleaner and
more competitive
Europe

In the light of the complexity of the textile value chain, ... the Commission will propose a comprehensive EU Strategy for Textiles.

The strategy will aim at strengthening industrial competitiveness and innovation in the sector, boosting the EU market for sustainable and circular textiles, including the market for textile reuse, addressing fast fashion and driving new business models.



The industry challenge & forward scenario

Less than 1% of material used to produce clothing is recycled into new clothing, representing a loss of EUR 100 billion worth of materials each year.



Fast Fashion Facts

Water

"It takes 2,700 liters of water to make just one" t-shirt"



Waste

"...three out of four garments will end up in landfills or be incinerated"

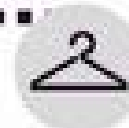
Textiles

"An estimated 400 billion square meters of textiles are produced annually, of which 60 billion square meters are left on the cutting room floor"

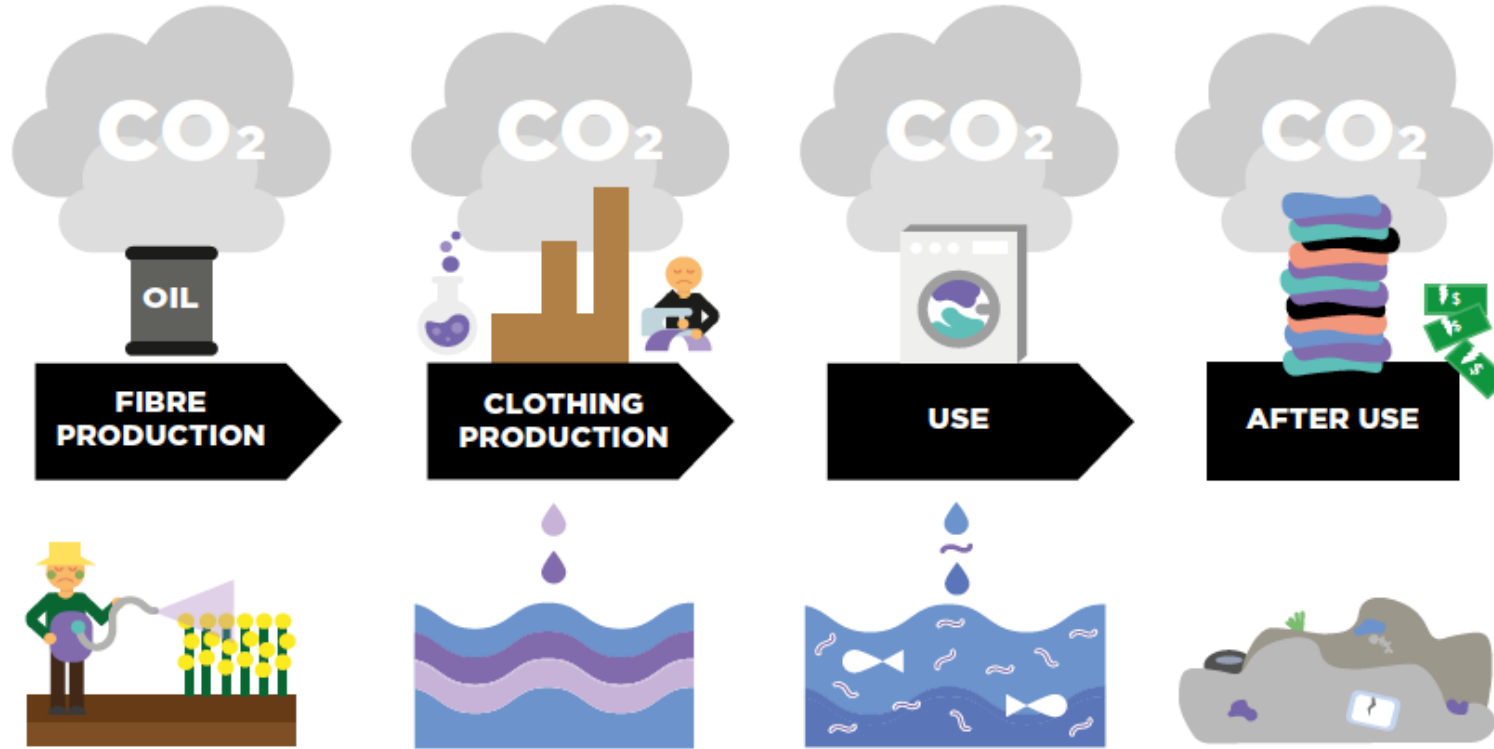


Consumption

Americans "buy twice as many items of clothing as they did twenty years ago"



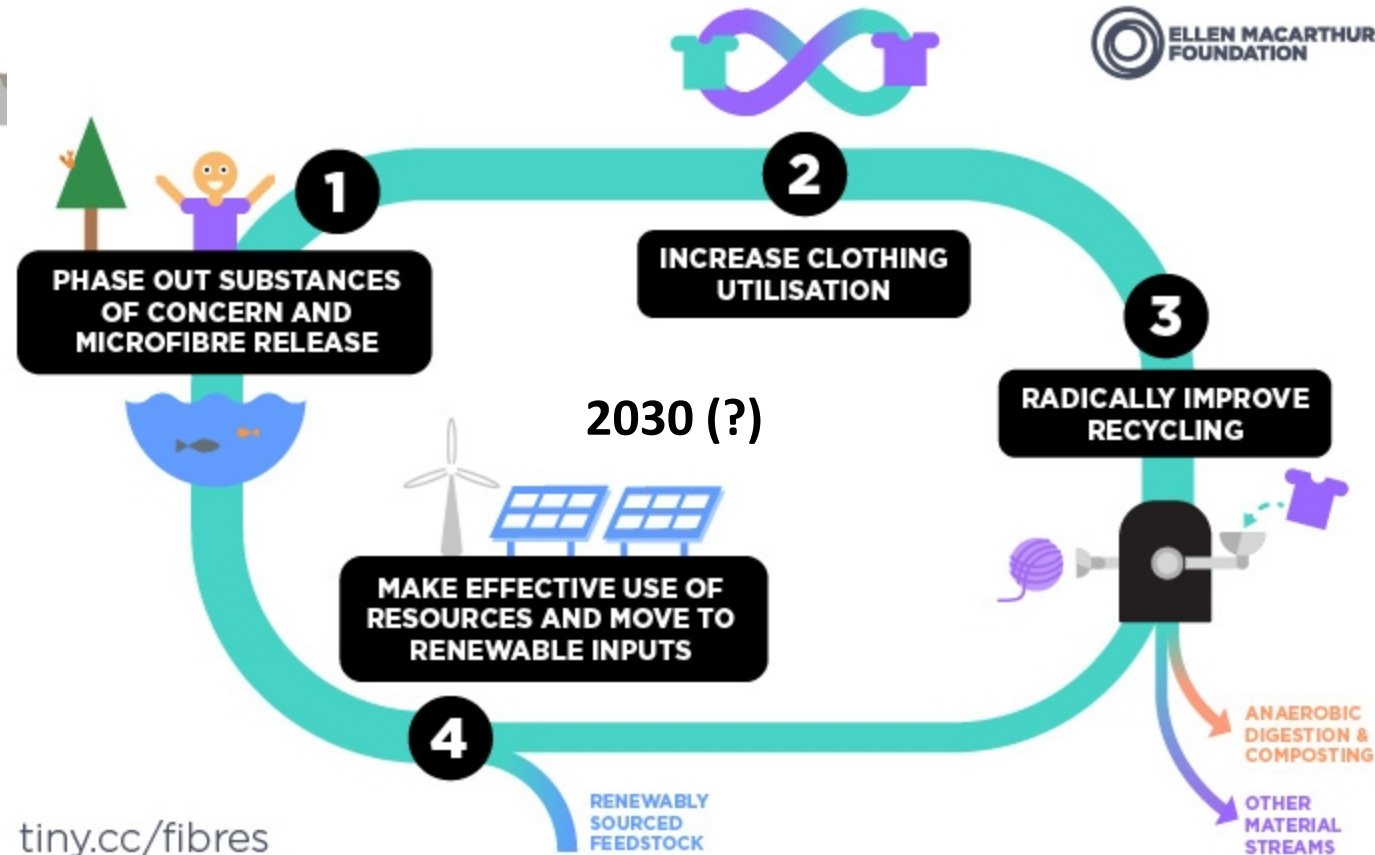
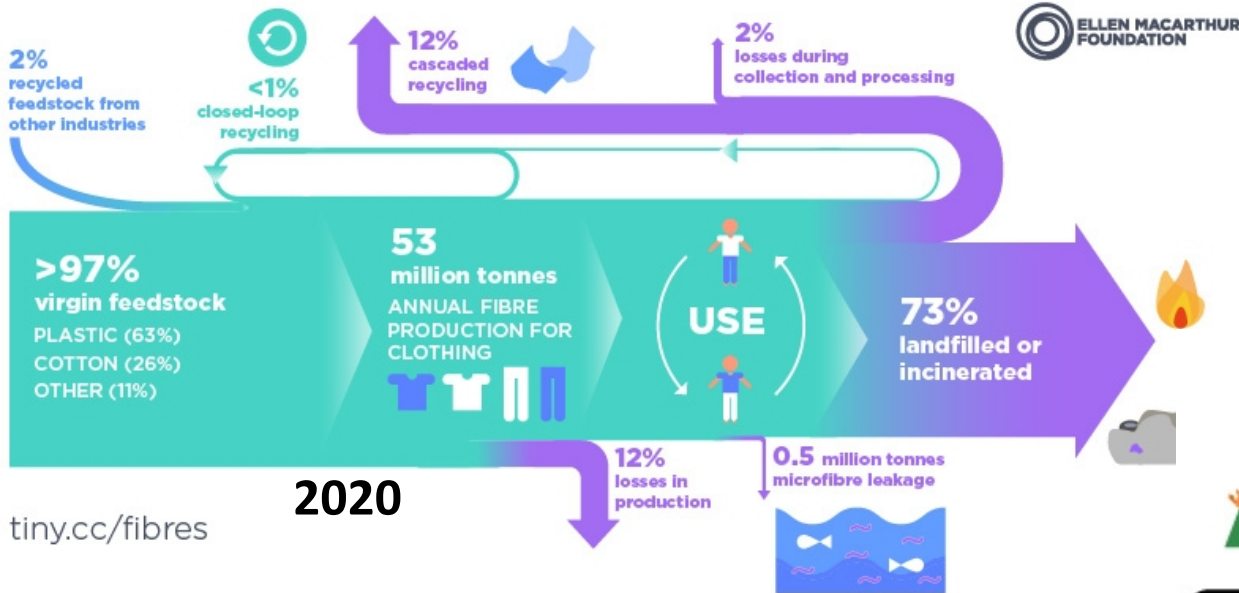
www.kendrascruggs.com
source: www.greenpeace.org



**Textile & clothing
production to
waste in a linear
economy**

“Circularity” in textiles

A circular economy is restorative and regenerative by design, and aims to keep products, components and materials at their highest utility and value at all times.





How can the consumer and the industry help in the transition to a circular textile economy?

reaction of Dutch former retail & textile manufacturing CEO's facing challenges

Textile industry in the Netherlands can be *circular in 2030*: **Agree**

High quality fiber from Post Consumer Recycled (PCR) textile can only be achieved combining *mechanical and chemical* processes: **Agree**

Synthetic (fossil) fibre based textiles will be phased out on the mid-term: **Disagree**

The only real option for fashion is to chemically recycle natural fibre based textiles: **Partly agree**

For technical and commercial viability of PCR, regulation and changing consumer behaviour are critical: **Agree**





Innovation in the circular value chain



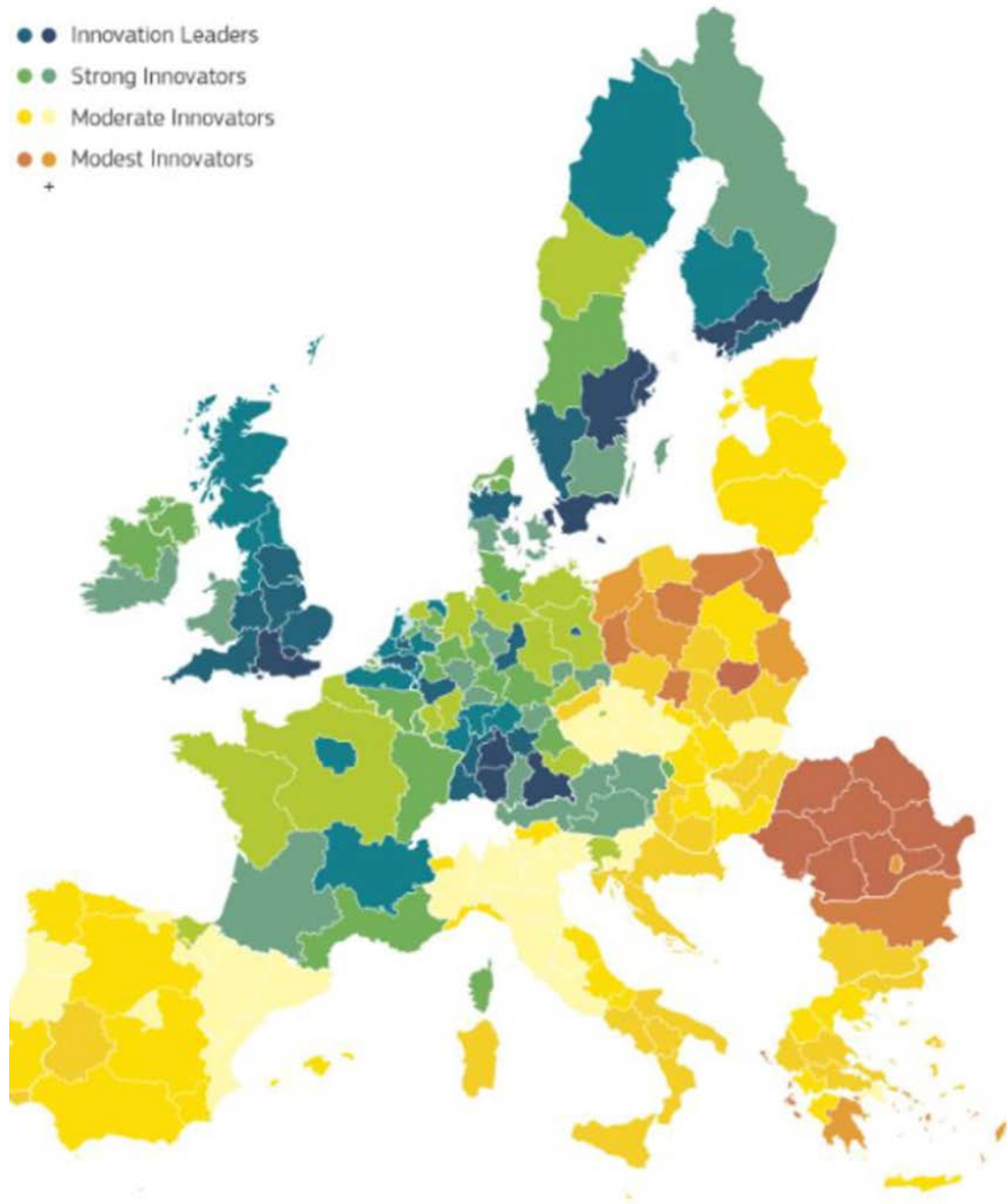
Long term trends in textiles & clothing



Strategic Innovation Themes

	Smart, high performance materials
	Advanced digitised manufacturing, value chains and business models
	Circular economy and resource efficiency
	High value added solutions for attractive growth markets

Innovation Index Europe's strengths



East Netherlands: since 19th century a cradle of textile industry

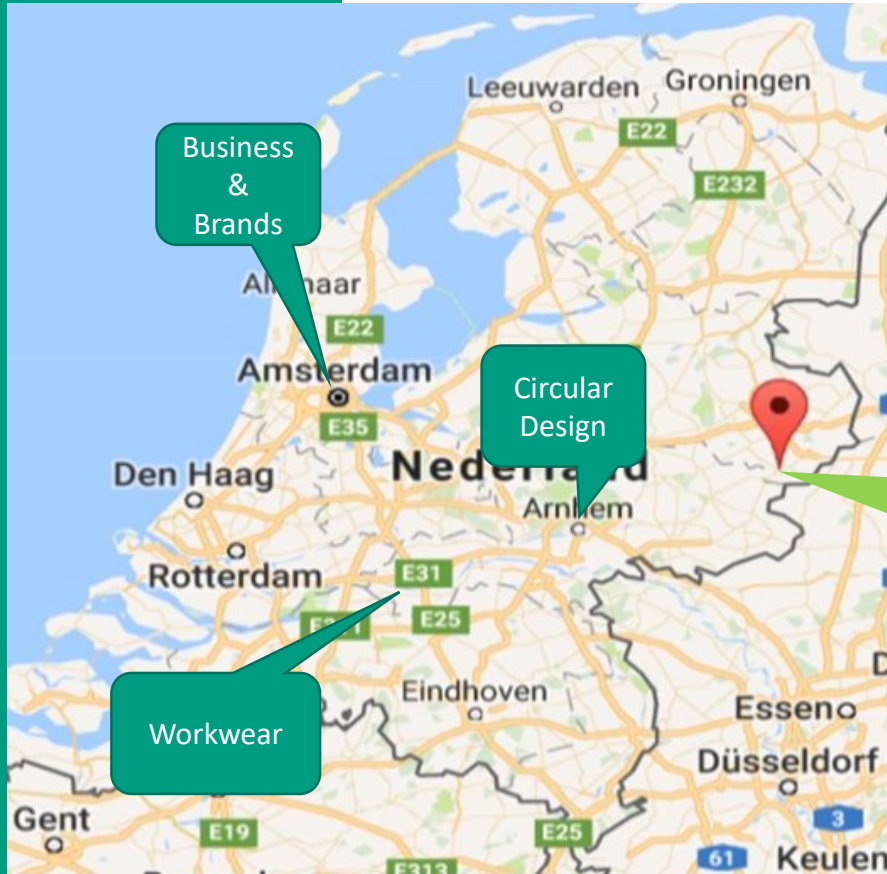


...and 100 years of textile higher
education!

Textile recycling in a new era



DCTV
DUTCH CIRCULAR
TEXTILE VALLEY



Dutch Circular Textile Valley:
4 textile hubs

Circular
Textile
Technology



SAXION
UNIVERSITY OF
APPLIED SCIENCES

MOD:NT

FASHION
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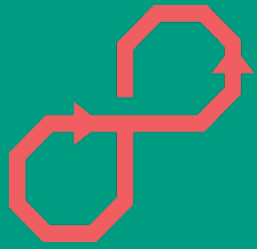
ABN-AMRO

Het Groene
Brein

MVO
NEDERLAND

CIRCLE
ECONOMY

TEXPLUS



TEXPLUS

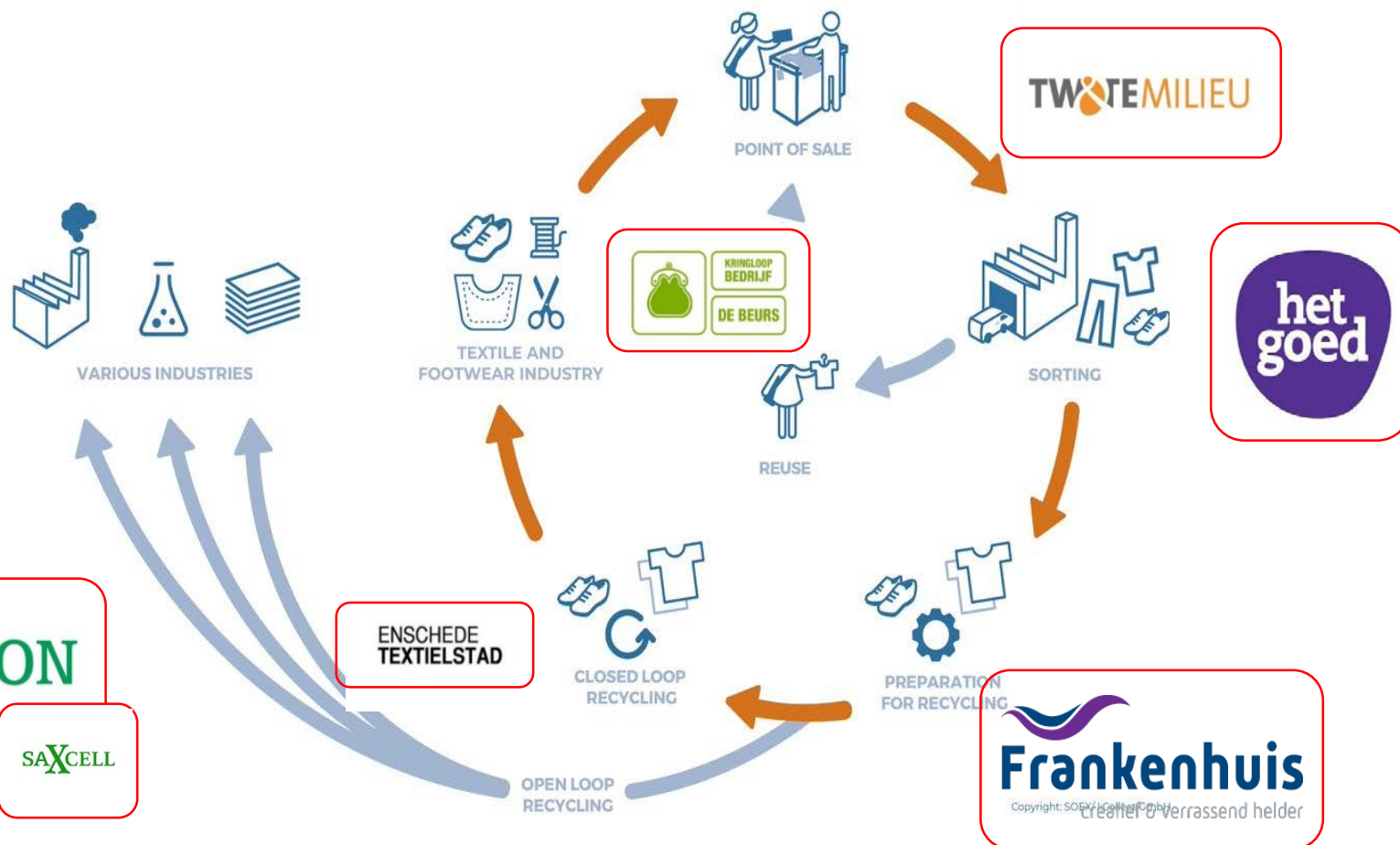
The challenges.
The network.
The roles.
Reaching “beyond local”
European initiative(s)



Textile recycling in a new era



6 regional partners
joining innovations in
the transition to a
circular textile economy



Goals & Ambition of the project

Post-consumer textile **collecting** volume: doubling from 1.400 to 3.000 tons in 2022

Post-consumer textile **sorting**: from 2.100 tons of textiles to 4.000 tons of textiles in 2022

Mechanical & Chemical **recycling**: from 8.000 tons to 15.000 tons of high added value source material

As a result:

7,000 tons of post-consumer textile waste returned as high-quality raw material in three years;

7,000 tons less incinerated waste and reduction in GHG's.



Challenge for post-consumer textile municipal “waste” collection:

Reducing “waste” volumes by increasing awareness and influencing behaviour among citizens in “citizenlabs”

Result: better quality reuse and recycle streams.



Challenge for textile sorting:

Stimulating clothing reuse by providing “shop quality supply”; semi-automated sorting to improve (mono)material stream quality.

Result: more reuse, higher throughput into monostreams. And a range of jobs in “makers industry” created.



Challenge for mechanical recycling:
Development of new technologies that improve recycled fibre quality, a.o. for input in chemical/extrusion recycling.

Result: identifying and developing new markets with added value.



Potential markets in (and outside) the textile value-chain:

- Durable non-woven suppliers, e.g. geotextiles
- (Security) Paper manufacturers
 - Spinning mills
- Thermoplastic composites



SAXCELL

Challenge for chemical regeneration of cotton-based textiles:

Demonstrate attractive (economical & ecological) upward potential for chemical regeneration of (post-consumer) cotton into high-quality cellulosics.

Result: operating pilot plant



ENSCHUDE
TEXTIELSTAD

Challenge for the textile makers:
Demonstrate that (post-consumer) recycling is *business as usual* in markets with substantial volumes.

Result: Flexible production platforms, new businessmodels, new (eco)designed concepts



Challenge for circular textile innovation:

Demonstrate upscaling potential for chemical regeneration of cotton into high-quality cellulosics.

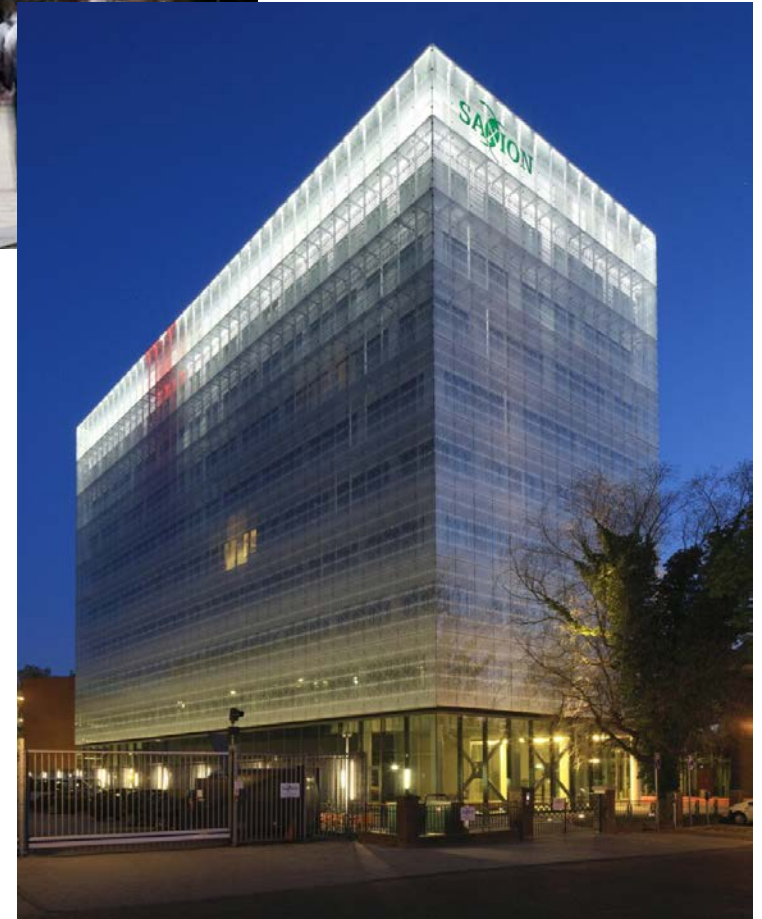
Result: (inter)national Centre of Expertise & Innovation

Saxion's role in TexPlus

- Saxion is a **University of Applied Sciences (UAS)**
- The Research Group “**Sustainable & Functional Textiles**” has an extensive regional and (inter)national network of industries & knowledge centres ()
- We do research, but at TRL levels from 5 to 8, and always based on stated interest from industry, policy-makers and citizens.

Saxion University of Applied Sciences

- Established in 1875
- University of Applied Sciences (UAS)
- 27.505 students (2019-2020)
- 2.812 employees
- Three locations:
 - *Enschede*
 - *Deventer*
 - *Apeldoorn*
- 14 Schools:



VISION

Students operating in a world where collaboration, Co-creation and multi-disciplinary are the standard.

The SDG's and the increasing role of materials & technologies at the core of innovative developments.



THE GLOBAL GOALS For Sustainable Development



Saxion

Revival of “Textile” economy in the Netherlands, driven by circular economy.

Building on our expertise of Sustainable and Functional materials, reflected in our research lines



Research Group Sustainable & Functional Textiles



2 Research lines Sustainable Textiles Functional Textiles

Design of Prototypes

Innovative textile Processes

Pilot equipment & Lab testing

Connected with

Bachelor Fashion & Textile
Technology

Master Innovative Textile
Development

Saxion Research & Graduate
School,

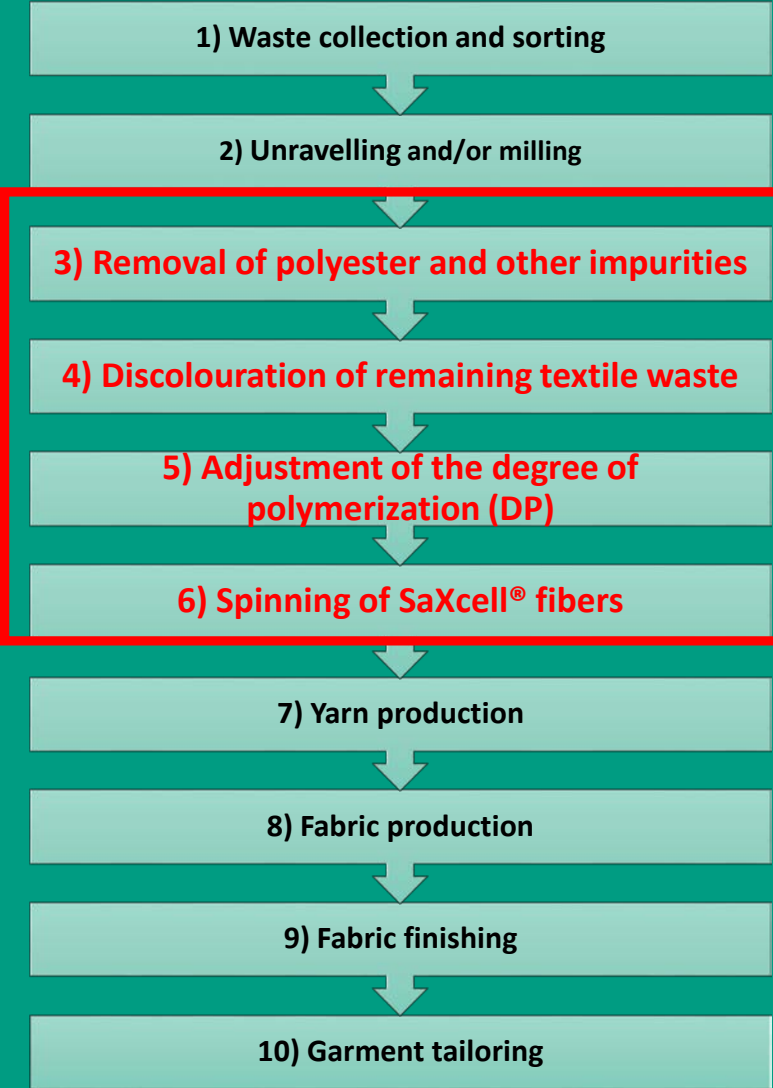


Sustainable
textiles



Functional
textiles

SaXcell® recycling process



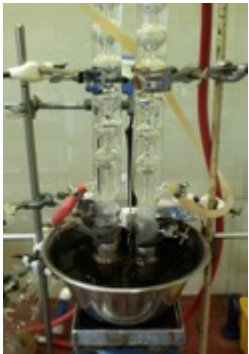
Lavans
Frankenhuis

Saxion UAS
SaXcell BV

Artofil

Van den Acker

Havep



Textile recycling in a new era

What we will do
2020-2022



- Work with ***citizenlabs*** in local communities to increase awareness on recycling and improve clothing pre-sorted textile streams.
- Improve ***materials sorting*** technology for clothing items and textile components on manual/automatic lines.
- Develop new ***flexible manufacturing platforms*** and related business models.
- Upscaling ***chemical recycling*** of post-consumer cotton, polyester textiles and polycotton mixtures.

Textile recycling in a new era

Next steps 2021-2030



- From *local* to national & *European* level:
- Find critical mass (streams) to build viable (10-50 kton) plant for post consumer recycled textile.
 - Primarily polyester/cotton blends
- Identify *new applications*, e.g. thermoplastic composites, and markets, e.g. textile architecture.
- Increase *track- & traceability*.
- Build expertise & innovation “hub” on textile recycling
- Join forces with CE initiatives in EU.

Textile recycling in a new era

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Ministerie van Landbouw,
Natuur en Voedselkwaliteit



Twente
Board



**UNIVERSITY
OF TWENTE.**

**roc van
twente**

Thank you for your attention



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